External Consumer Access to FAA Data via SWIM

FAA Communications, Information & Network Programs Group (CINP)

Date: March 2016

Topics

- **SWIM Background**
- **Data Product Availability**
- **Becoming a SWIM Consumer**
- **FAA Documents for SWIM Consumers**

SWIM Background and Benefits

- **Replaces unique interfaces with modern standards-based data exchange**
- **Provides stakeholders with access to FAA data without having to connect directly to individual systems**
- **Facilitates leveraging a single interface to receive multiple data products**
- **Establishes a single point of contact for FAA data**
- **Establishes Enterprise Help Desk for SWIM operational consumer calls**
- **More information provided at:**
  - http://www.faa.gov/nextgen/swim

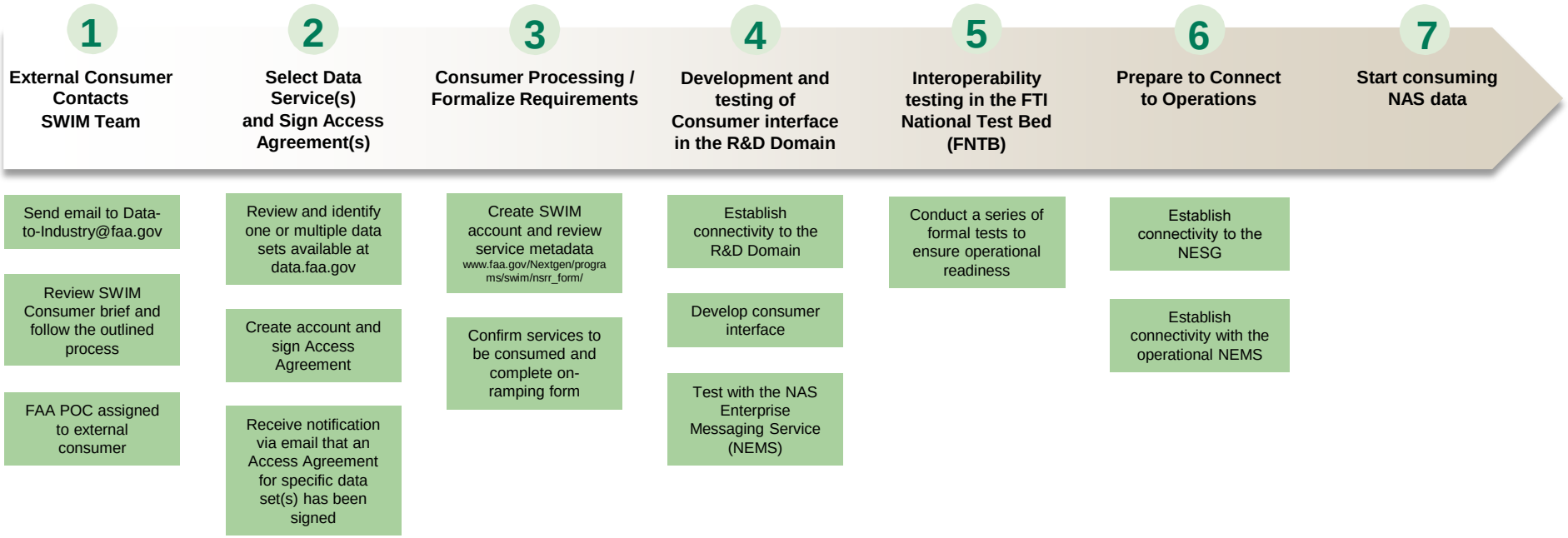
SWIM Data Product Availability

Data product specifics are located at the end of this document:

- **Flight Information**
- **Weather Information**
- **Aeronautical Information**

Visit Access Agreement Portal at http://data.faa.gov to register and request access.

External Consumer On-ramping Process



Note 1: Existing NEMS users may skip to the FNTB or Operations stage
Note 2: AIM FNS NOTAM Distribution consumers will not connect to R&D domain in Step 5, see AIM Section at end of this briefing

Step1: Process Kick-off

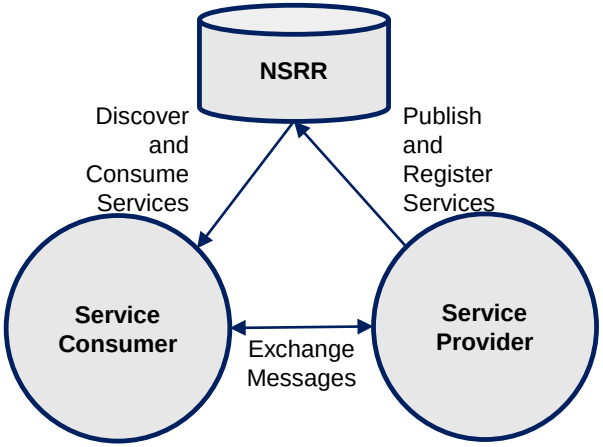
- **Send an email to Data-To-Industry@faa.gov as soon as possible**
  - Upon receipt of email, FAA will assign a POC to address questions and escalate issues
- **Tips to Consumers**
  - Sending the email is a critical step in the process
  - Reach out to the FAA POC with questions
    - Your POC will review steps and timelines associated with on-ramping

Step 2: Data Catalog and Access Agreement

- **NAS Data Release Group**
  - The NAS Data Release Group evaluates all applicable NAS Data Release requests for the FAA to determine if they are eligible for approval by the NAS Data Management Director. The FAA may only release NAS data to external organizations identified in an approved Access Agreement
- **Create an account at data.faa.gov and sign Access Agreement**
  - All NAS data available for external distribution is cataloged in data.faa.gov
- **Tips to Consumers**
  - You will receive an email with your signed copy of the Access Agreement
    - Keep this Access Agreement copy for your records

Step 3: Service Requirements

- **NAS Service Registry/Repository (NSRR)**
  - Purpose: The NAS Registry and Repository (NSRR) contains the "read-me-first" documents needed to develop Consumer interfaces (e.g. Web Service Deployment Descriptors (WSDD), JMS Description Documents (JMSDD), WSDLs, XML schemas, etc).
- **FAA POC works with consumer to complete on-ramping form**
- **Tips to Consumers**
  - Prior to client development, review NSRR for supporting product documentation
  - Allow 2 business days for account creation
    - https://nsrr.faa.gov/user/register
    - If you are not an FAA contractor or employee, select FAA Business Partner for Affiliation when registering.
  - SWIM Governance Policies at link:
    - http://www.faa.gov/nextgen/programs/swim/governance/standards/



Steps 4-6: Establish Connectivity

- **Review the "*FTI NBPS User Guide*" Document**
  - Understand Section 4 - connection options and availability
  - Understand Section 5 - External End-User Security Responsibilities
  - Understand Section 7 - VPN Technical Requirements
- **Provide the following information to FAA POC**
  - IP Addresses
    - External IP Address of VPN Concentrator
    - IP Addresses of systems that will be accessing the FAA
- **FAA POC provides information for connectivity**
- **Tips to Consumers**
  - Identify critical staff (Network administrator and Security administrator)
    - VPN experience
    - Understanding of consumer network, IP addressing, and change management
    - Understanding of any existing connectivity to the FAA
  - Configure VPN prior to VPN Technical Call
    - Verify internal network routing
    - Configure or update encryption domain
  - Map entire subnets for the NEMS servers rather than unique IP addresses

Step 4: Client Development in the Dev Test Environment

- **First time External Consumers connect to Dev Test Environment**
- **Start client development in parallel with establishing connectivity to Dev Test Environment**
- **Tips to Consumers**
  - Review the NEMS User Guide
    - Determine JMS Client Type as early as possible *(see next slide)*
    - Understand Basic and Enhanced capabilities of NEMS
  - Identify critical staff to facilitate development
    - Identify experienced Java Message Service (JMS) Developer
  - Review the SWIM Jump start kit
  - To avoid client development process, consider licensing JMS client from third party

Step 4 (cont'd): Client API Versions and Standards Supported by SWIM NEMS

JMS Client APIs			
Vendor:	Solace (standard)	FuseSource (requires exception approval)	Oracle (requires exception approval)
Name:	Solace	ActiveMQ	WebLogic 11g
Version:	7.1.0.207	5.5.1	10.3.5.0

All data products are available on Solace; limited data product set available using ActiveMQ and WebLogic

Web Services	
Feature:	**Specification:**
Web service description	Web Services Description Language (WSDL) 1.1 - XML-based specification that describes a Web service.
Data exchange between Web service and requesting client	Simple Object Access Protocol (SOAP) 1.1 and 1.2 - Lightweight XML-based protocol used to exchange information in a decentralized, distributed environment.
Reliable communication	Web Services Addressing (WS-Addressing) 1.0 - Transport-neutral mechanisms to address Web services and messages

Step 5: FAA FTI National Test Bed (FNTB)

- **External Consumers are required to connect to the FNTB**
  - Establish connectivity to the FNTB Domain
  - Perform FNTB consumer qualification testing with the FNTB NEMS environment
    - Required prior to deploying in the operational NAS environment
  - FNTB qualification ensures that consumer has connectivity and is able to receive messages via NEMS
  - Determine if your desired operational connectivity approach requires additional testing in the FNTB
  - Perform failover tests

Note: Consumers with FNTB verified JMS clients will not need re-verification for additional JMS services.

Step 6 and 7: Prepare for Operations and On-Going Support

- **Preparing for Cutover**
  - FAA POC will coordinate your connection and cutover, including status checks, contact information for subject matter experts

- **After transition to Operational Environment**
  - The Network Enterprise Management Center (NEMC) will serve as the SWIM helpdesk for Consumers that have been cut-over to Production
  - NEMC Contact Information:
    - 855-FAA-NEMC (855-322-6362)
    - Use option 3 for Enterprise Services
    - 24/7/365

FAA Documents and Links

SWIM Background
http://www.faa.gov/nextgen/swim

Access Agreement Portal
http://data.faa.gov

NSRR Account Request Form
https://nsrr.faa.gov/user/register

SWIM Jumpstart Kit v4.3
http://www.faa.gov/nextgen/programs/swim/documentation/media/swim_standards/JumpstartR4.zip

FTI NBPS User Guide Volume II- For Non-NAS Users
http://www.faa.gov/nextgen/programs/swim/documentation/media/user-guide/FTI_NBPS_User_Guide.pdf

SWIM NEMS User Guide
http://www.faa.gov/nextgen/programs/swim/documentation/media/user-guide/SWIM_NEMS_User_Guide.pdf

VPN Technical Requirements (excerpt from FTI NBPS User Guide Volume II- For Non-NAS Users)
http://www.faa.gov/nextgen/programs/swim/documentation/media/user-guide/VPN_Technical_Requirements.pdf

Consumer On-Ramping Form
http://www.faa.gov/nextgen/programs/swim/documentation/media/user-guide/External_Consumer_On-Ramping_Form_Template.xlsx

Pre-Operational Deployment Key Contacts

- Your organization will be provided both a primary and backup POC upon entry into the external consumer on-ramping process

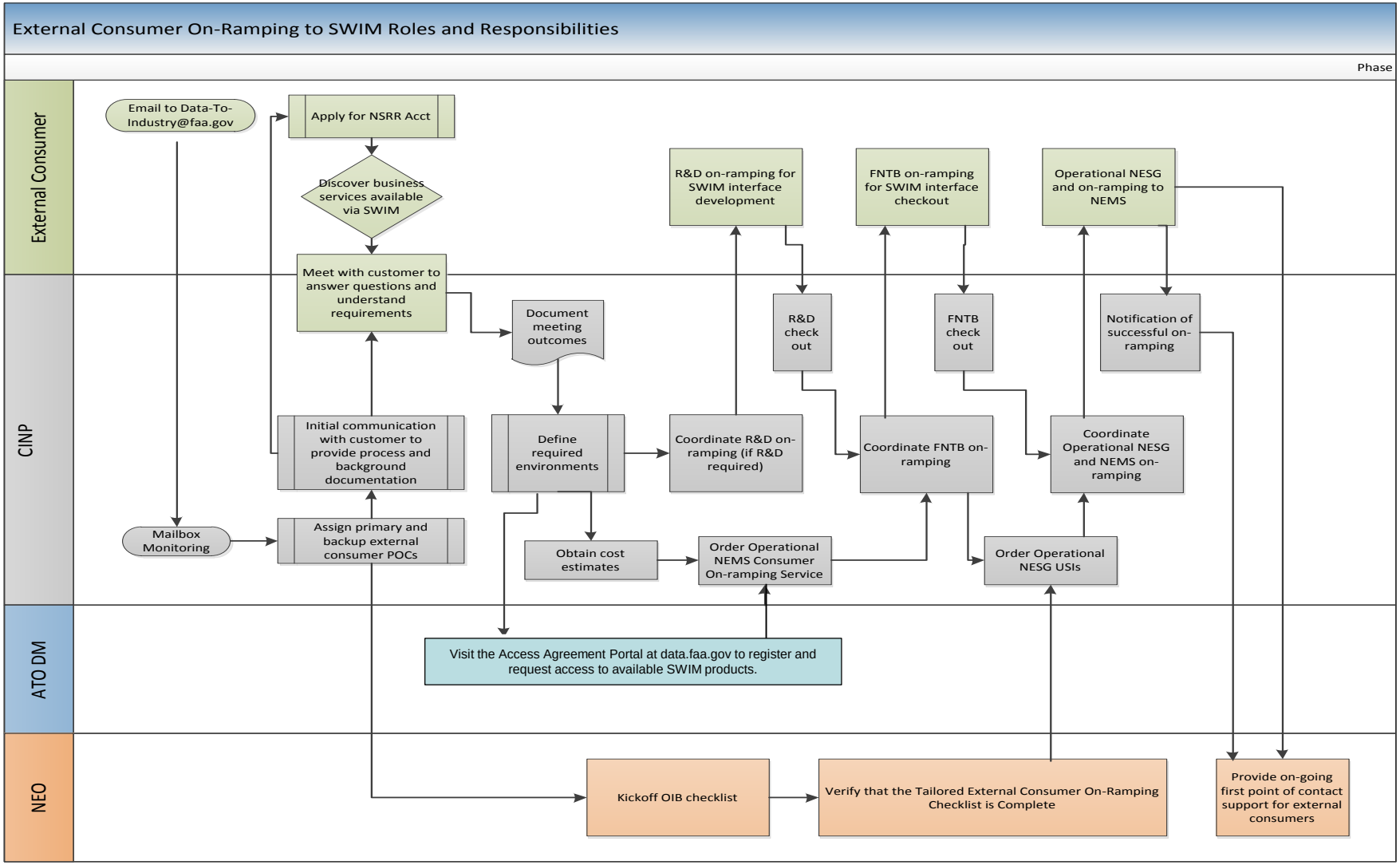
Mailbox: **Data-To-Industry@faa.gov**

• Alex Prikhodko	Alexander.ctr.prikhodko@faa.gov
• Alex Murray	Alexander.murray@noblis.org
• Brandon Wang	Brandon.ctr.wang@faa.gov
• David Wickes	David.ctr.wickes@faa.gov
• Wendy Swartz	Wendy.ctr.swartz@faa.gov
• Rob Johnson	Robert.ctr.johnson@faa.gov
• Michelle Sreedharan	Michelle.ctr.sreedharan@faa.gov

AIM FNS NOTAM Distribution

- **Process Flow for AIM FNS NOTAM Distribution**
  - Please review the entirety of this package
    - All steps and sections are relevant with the exception of R&D
  - To start client development, follow the directions provided at http://notamdemo.aim.nas.faa.gov/ndshome/#WelcomeNews
    - Use the “Contact Us” link on the above homepage for assistance during client development
  - You may choose to have your SWIM on-ramping kick-off call prior to, during, or after completion of client development
  - To schedule your kick-off call and have a SWIM On-Ramping POC assigned (if one has not already been assigned), please send an email to Data-To-Industry@faa.gov and include
    - Company Name
    - Data products requested
    - Company Points of Contact

External Consumer On-Ramping Process



Flight Information

Currently Available

Planned

- **Traffic Flow Management System (TFMS)**
  - ASDI replacement with additional Flow Information Data
- **SWIM Terminal Data Distribution System (STDDS)**
  - Surface Movement Event Service (SMES) *Surface Surveillance*
  - Terminal Automation Information Service (TAIS) *Terminal Surveillance*
- **SWIM Flight Data Publication Service (SFPDS)**
  - ERAM CMS Message Publication | ARTCC (En Route) Flight & Airspace Data
- **Time Based Flow Management (TBFM)**
  - Aircraft, Airport Configuration, and Metering Status Information
- **Terminal Flight Data Management (TFDM)**
  - Decision Support Tools for Airport and Terminal Airspace

Flight Information – Page 1

Traffic Flow Management Data			
Descriptor	**Data Description**	**Associated Release**	**Availability**
TFMData - Flight Data	**Flight Data is designed to provide the same base data as legacy ASDI, enhanced with additional data related to flights being managed by TFMS including state data equivalent to, or representative of, the TFMS NCSM.** • Flight Plan Data, Departure & Arrival time notifications, • Flight cancellations • Boundary crossings • Track position reports • Flight management • NAS Common Situational Model data • Flight Table Manager deltas (e.g. flight operator messages)	R10	currently available
TFMData - Flow Information	**Flow Information provides the definition of TMIs, changes to those definitions, and cancellations which includes additional parameter data related to TMIs being created, updated, and deleted by TFM users via legacy interfaces or by authorized TFMData Request/Reply users.** • All Traffic Management Initiative (TMI) definitions (Reroutes, Ground Stop (GS) • Ground Delay Program (GDP) / Unified Delay Program (UDP) • Airspace Flow Program (AFP) • Collaborative Trajectory Options Program (CTOP)) • Flow Constrained Area (FCA) / Flow Evaluation Area definitions (FEA) • Air Traffic Control System Command Center (ATCSCC) advisories • Restrictions • Airport runway configuration and rates • Airport deicing status • Route Availability Planning Tool (RAPT) timeline data	R10	currently available

Flight Information – Page 2

Traffic Flow Management Data			
Data Type	**Data Description**	**Associated Release**	**Availability**
TFM - Request Reply	**The TFM Request/Reply Business Function exposes all of the TFMS services and makes them available to the SWIM community. TFMS Request/Reply is managed by TFMS by authorizing user request to ensure only FAA approved users are requesting services of the TFMS. These services include:** • The capability to create/update/delete/model/monitor Traffic Management Initiatives (TMI). • The capability to interact with the TFMS in support of the TMI (CDM and Flight Operator System (FOS) Services • The capability to control the Schedule Database. • The capability to issue Estimated Departure Clearance Time (EDCT) commands. • The capability to reconstitute Flight Data. • The capability to resynchronize TMI definitions and associated flight lists.	new in R13	available for testing Q2 2016
TFM - Status	**The TFMS Status Business Functions provides the status of the of the incoming and outgoing message traffic that TFMS is dependent on to maintain the flow of information from and to NEMS. The status is broken down to the individual reporting unit. These services include:** • Provides the last time and the cumulative number of messages that were either received or transmitted since the session (TCP/IP or JMS) was established • Provides the state of the TFMS communication channel: Enabled or Disabled.	new in R13	available for testing Q2 2016
TFM - IDP	The International Flight Data Business Functions provides the means for TFMS to exchange flight information with International Data Providers	new in R13	available for testing Q2 2016

Flight Information – Page 3

Terminal Data Distribution Service		
Descriptor	**Data Description**	**Availability**
SMES	**Surface Movement Event Service (SMES) provides event date/time for each flight at all 35 ASDE-X and eventually 9 ASSC airports:** • Spot Out (departure aircraft crosses from ramp to surface movement area) • Spot In (arrival aircraft crosses from surface movement area to ramp) • On (wheels down) • Off (wheels up)	currently available
	For each aircraft in the movement area or nearby airspace of all 35 ASDE-X and eventually 9 ASSC airports: **Category 11 data** • Mode S / Mode 3A • Departure or Arrival Runway • Departure fix for departures • Departure airport for arrivals • Wake Class • Position / heading / speed / altitude • Fused track acceleration • Coasted or suspended track number • ADSB Info • Source / reliability info **Generic Flight Plan Data** • FP interface type (ARTSIIIA, ARTSIIIE, STARS, GFP, MicroEARTS) • Aircraft type / category • Entry / exit fix • Flight Type (arrival, departure, enroute) • Assigned Runway • Scratch pad	
TAIS	**Terminal Automation Information Service (TAIS) will publish STARS data in XML. A total of 156 STARS sites will be supported.** • STARS System Status (TAStatus) • STARS Track and Flight Plan Data (TATrackAndFlightPlan) • STARS Alert, SISO, IMC, Traffic Count and Performance Monitoring data in XML wrapped base64 encoded version (TARaw)	Sites Deployed in Waterfall Starting Q2 2016

Flight Information – Page 4

Flight Data Publication Service		
Descriptor	**Data Description**	**Availability**
FPDS - En Route Flight Data Service	**The En Route Flight Data Service is a service for consumers to request or subscribe to flight data. En Route Flight Data Publication allows the consumer to specify messages of interest (for example, all messages pertaining to a specific airline's flights).** • Proposed and active flight plans • track data associated with active flights • arrival and departure data • over flight data and flight strip and auxillary flight data including runway assignments	currently available
FDPS - En Route Air Space Data Service	**The En Route Operation Data Service provides Operational data, which includes the following:** • facility sectorization assignments • updates within enroute domains • adapted and departure route status • adapted and departure route status	currently available
FDPS - En Route Operational Data Service	**The En Route Operation Data Service provides Operational data, which includes the following:** • sign-in / sign-out information • traffic count • instrument approach count adjustments and beacon code utilization	currently available
FDPS - En Route General Information Publication	**The En Route Operation Data Service provides Operational data, which includes the following:** • ad-hoc freeform text messages entered by various system users	currently available

Flight Information – Page 5

Flight Information		
Descriptor	**Data Description**	**Availability**
TBFM MIS	**The TBFM Metering Information Service at each ARTCC publishes metering information describing the metering data in use at each ARTCC in the National Airspace System (NAS). TBFM metering information data includes knowledge of when metering is in effect at an ARTCC when Adjacent Center Metering (ACM) is occurring and at which sites, flight STAs to the runway threshold, meter fix and all arcs, flight ETAs to the runway threshold, meter fix and all arcs, airport configurations presently in effect at every ARTCC, airport acceptance rates and flow settings (e.g., runway buffer), and En Route Departure Capability (EDC) aircraft departure times.** • **Aircraft information** – Flight Plan Information (some), ETAs, STAs, Meter Reference Element (MRE) information, and Scheduling information • **Configuration information** - Arrival Airport Configuration Information, Airport Acceptance Rate Group, TRACON Acceptance Rate Group, Meter Point Acceptance Rate Group, Runway Acceptance Rate Group, Super Stream Class Configuration Group, and Satellite Airport Configuration Group • **Status Group information** – TBFM Metering Status, TBFM Interface Status • **Adaptation Information** – TRACON Name, Gate Name, Arrival Airport Information, Airport Configuration, and MRE Information	Mid 2016
TFDM	**The Terminal Flight Data business function provides data that TFMS receives from their partner airline systems to the FAA's Terminal Flight Data Manager (TFDM) as an aggregate feed. TFDM uses the airline data along with data from other FAA systems to provide their Surface Collaborative Decision Making capability.** • **ATCT Control automation** – Provides Electronic Flight Strips and other electronic data in tower – Improves electronic data integration across all ATC domains including external stakeholders (airlines, airports, ramp towers) • **ATCT Traffic Flow automation for surface management** – Integrates with TFMS & TBFM data to extend TFM to the "last mile" - the gate – Provides Surface Situation Awareness tool (SSA) via TFMS tower displays to all domains (ATCTs, TRACONs, ARTCCs, and ATCSCC) – Provides tools for CDM for surface operations including a departure scheduler, surface metering for departures, and other airport decision capabilities	2021 / 2022

Weather

Currently Available

Planned

- **Integrated Terminal Weather Service (ITWS)**
  - Graphic and Textual Weather Products
- **SWIM Terminal Data Distribution System (STDDS)**
  - Runway Visual Range as part of Airport Data Service (APDS)
- **Weather Message Switching Center Replacement (WMSCR)**
  - Textual Weather Products
- **Common Support Services – Weather (CSS Wx)**
  - Modernized, Centralized and Streamlined Distribution of All Weather Products

Weather Services – Page 1

Weather		
Descriptor	**Data Description**	**Availability**
ITWS	**Integrated Terminal Weather System (ITWS) provides a variety of weather information in graphic and textual forms, such as windshear and microburst predictions, storm cell and lightning information, and terminal area winds aloft. Specific data provided includes:** • Microburst TRACON Map • Microburst ATIS • Wind Shear ATIS • Gust Front TRACON Map • Gust Front TRACON ETI • Configured Alerts • Terminal Weather Text Normal • Terminal Weather Text Special • Precipitation 5nm • Precipitation TRACON • Precipitation Long Range • Tornado Detections • Tornado Alert • Airport Lightning Warning • SM_SEP 5nm • SM_SEP TRACON • SM_SEP Long Range • Forecast Image • Forecast Contour • Wind Profile • Runway Configuration • Hazard Text 5nm • Hazard Text Long Range • AP Status • AP Indicated Precipitation • ITWS Status Information • Terminal Weather Graphics Text	Currently Available

Weather Services – Page 2

Weather		
Descriptor	**Data Description**	**Availability**
CSS Weather	**Common Support Services - Weather (CSS-Wx) will modernize, centralize and streamline distribution of weather within the NAS. CSS-Wx will replace existing weather data feeds.**	2017
WMSCR	**The Weather Message Switching Center Replacement System (WMSCR) collects, processes, stores, and disseminates textual aviation weather products including PIREPs and altimeter data** • Publish PIREP • Publish Altimeter Settings • WMSCR Report Retrieval Service	Tentatively available in 2017
APDS	**Airport Data Service (APDS) provides Runway Visual Range (RVR) observation messages for each RVR-equipped runway at approximately 130 selected NG and PC RVR airports:** • Visual range in hundreds of feet at touchdown, midpoint, and rollout • Visibility trend (steady, increasing, decreasing) at touchdown, midpoint, and rollout • Runway edge light and center light setting intensity from 0 (off) to 5 (maximum)	currently available

Aeronautical Information

Currently Available

Planned

- **AIM Federal NOTAMS Distribution System (AIM FNS)**
  - Digital NOTAMs via Request/Reply (Web Service)
  - Digital NOTAMs via Publish/Subscribe (JMS)
- **AIM Special Activity Airspace (AIM SAA)**
  - Airport reference and configuration data, definitions and schedule information for Special Activity Airspace.
- **AIM Modernization Segment Two (AIM-M S2)**
  - Modernize the ingestion, integration, management, and distribution of aeronautical information (AI) by establishing the Aeronautical Common Services (ACS) and a one-stop-shop (OSS) portal.

AIM – Aeronautical Information Management

Aeronautical Information – Page 1

Aeronautical Information		
Descriptor	**Data Description**	**Availability**
AIM FNS Request Response	The FNS NOTAM Distribution Service (FNS NDS) is a web service that provides digital NOTAM messages in AIXM in response to requests by end users. The FNS NDS is a system-to-system interface that enables end systems to receive digital NOTAMs from FNS. The FNS NDS uses the event schema developed by the international Digital NOTAM Focus Group jointly led by EUROCONTROL and the FAA. Digital NOTAM messages exchanged through the FNS NDS include static baseline features as well as the temporary changes due the NOTAM event and enable the graphical display of NOTAMs. The FNS NDS supports the distribution of all NOTAMs, to include the digital NOTAMs originated through the FNS as well as legacy NOTAMs originated through the legacy system	Currently available
AIM FNS Publish Subscribe	The FNS NOTAM Distribution Service (FNS NDS) will be available using publish subscribe 2016. The FNS NDS is a system-to-system interface that enables end systems to receive digital NOTAMs from FNS. The FNS NDS uses the event schema developed by the international Digital NOTAM Focus Group jointly led by EUROCONTROL and the FAA. Digital NOTAM messages exchanged through the FNS NDS include static baseline features as well as the temporary changes due the NOTAM event and enable the graphical display of NOTAMs. The FNS NDS supports the distribution of all NOTAMs, to include the digital NOTAMs originated through the FNS as well as legacy NOTAMs originated through the legacy system	Mid 2016

Aeronautical Information – Page 2

Aeronautical Information		
Descriptor	**Data Description**	**Availability**
AIM SAA	**Aeronautical Information Management Special Activity Airspace provides Airport reference and configuration data, definitions and schedule information for Special Activity Airspace (SAA) including:** • Temporary Flight Restriction (TFR) data • Federal NOTAMS Distribution Service (FNS) Data • Obstacles data • Procedure (RNAV/RNP) data	Limited Deployment early 2017
AIM Modernization Segment Two / Release 2	**AIMM Segment 2 (S2) will modernize the ingestion, integration, management, and distribution of aeronautical information (AI) by establishing the Aeronautical Common Services (ACS) and a one-stop-shop (OSS) portal. Capability to consumers for this release is limited to the review of data sets.** • Airport Reference and Configuration Data • Definitions and Schedule Information for Special Activity Airspace • Temporary Flight Restriction (TFR) data • Federal NOTAMS Distribution Service (FNS) Data • Obstacles data • Procedure (RNAV/RNP) data	Limited Deployment early 2017
AIM Modernization Segment Two / Release 3	**AIMM Segment 2 (S2) will modernize the ingestion, integration, management, and distribution of aeronautical information (AI) by establishing the Aeronautical Common Services (ACS) and a one-stop-shop (OSS) portal. Additional capabilities available to consumers for this release including ability to query data.** • Airport Reference and Configuration Data • Definitions and Schedule Information for Special Activity Airspace • Temporary Flight Restriction (TFR) data • Federal NOTAMS Distribution Service (FNS) Data • Obstacles data • Procedure (RNAV/RNP) data	2018